

Title: SYSTEM AND METHOD FOR PERFORMING PATH-SENSITIVE
VALUE FLOW ANALYSIS ON A PROGRAM

Inventors: Manuvir Das et. al

Docket No: MS#305140.1 / LH# MS1-1734US

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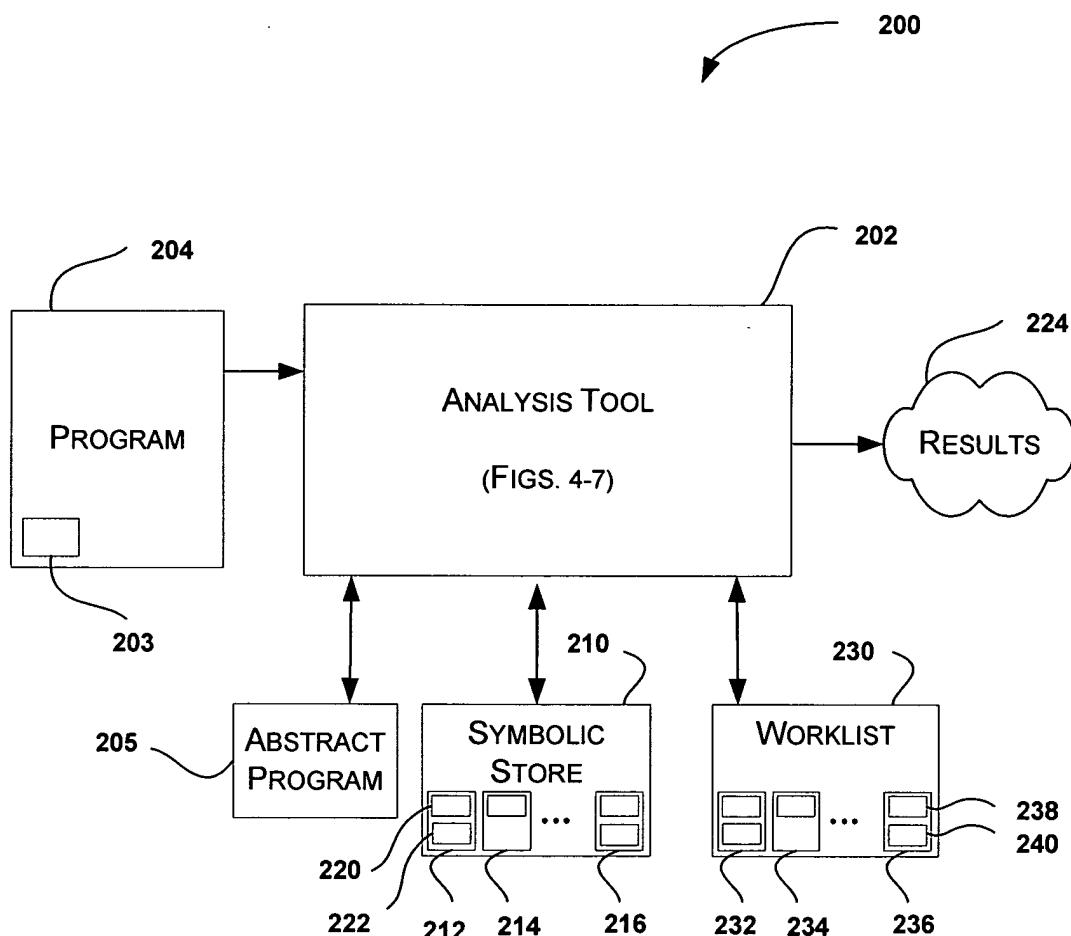
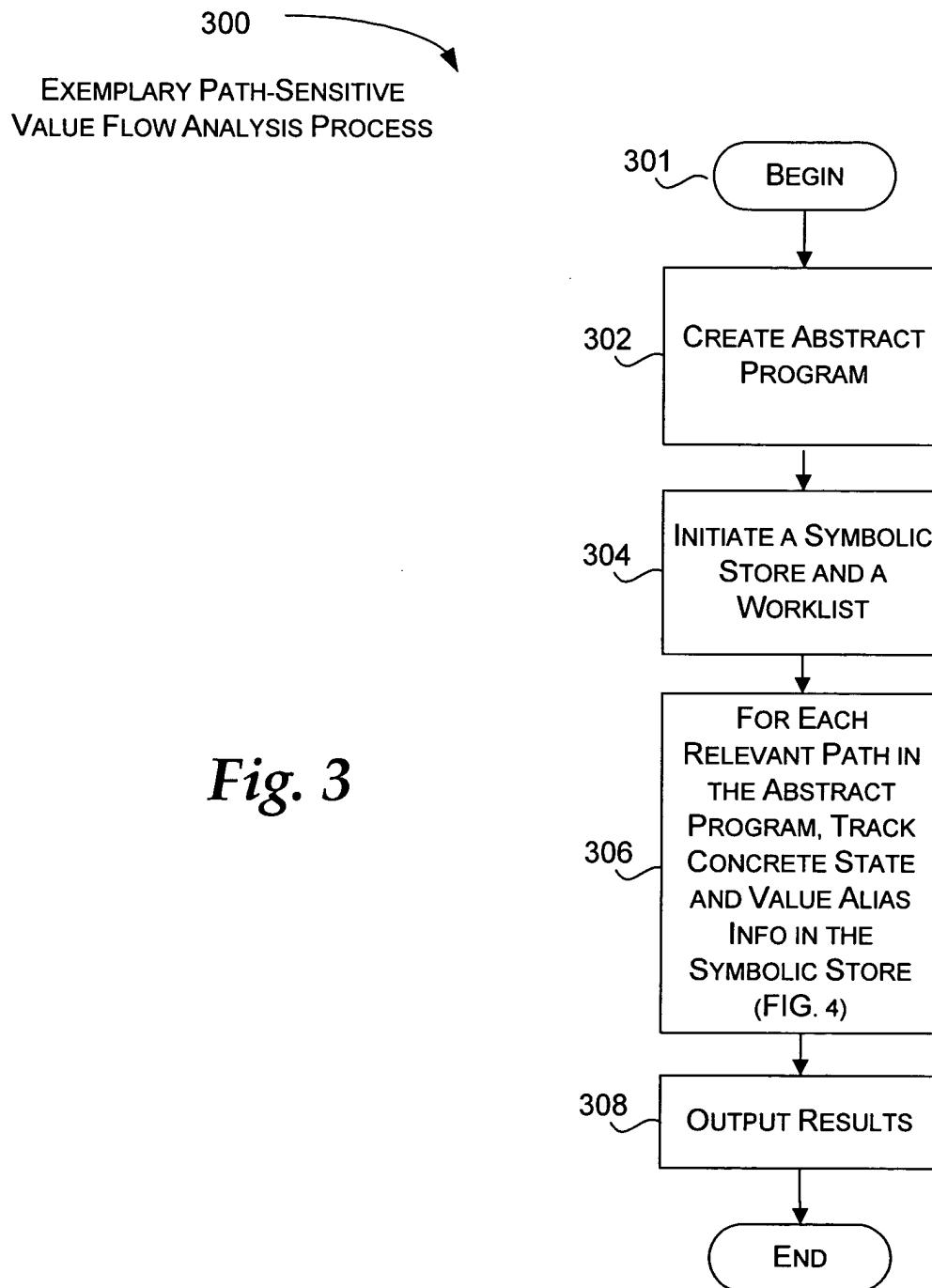


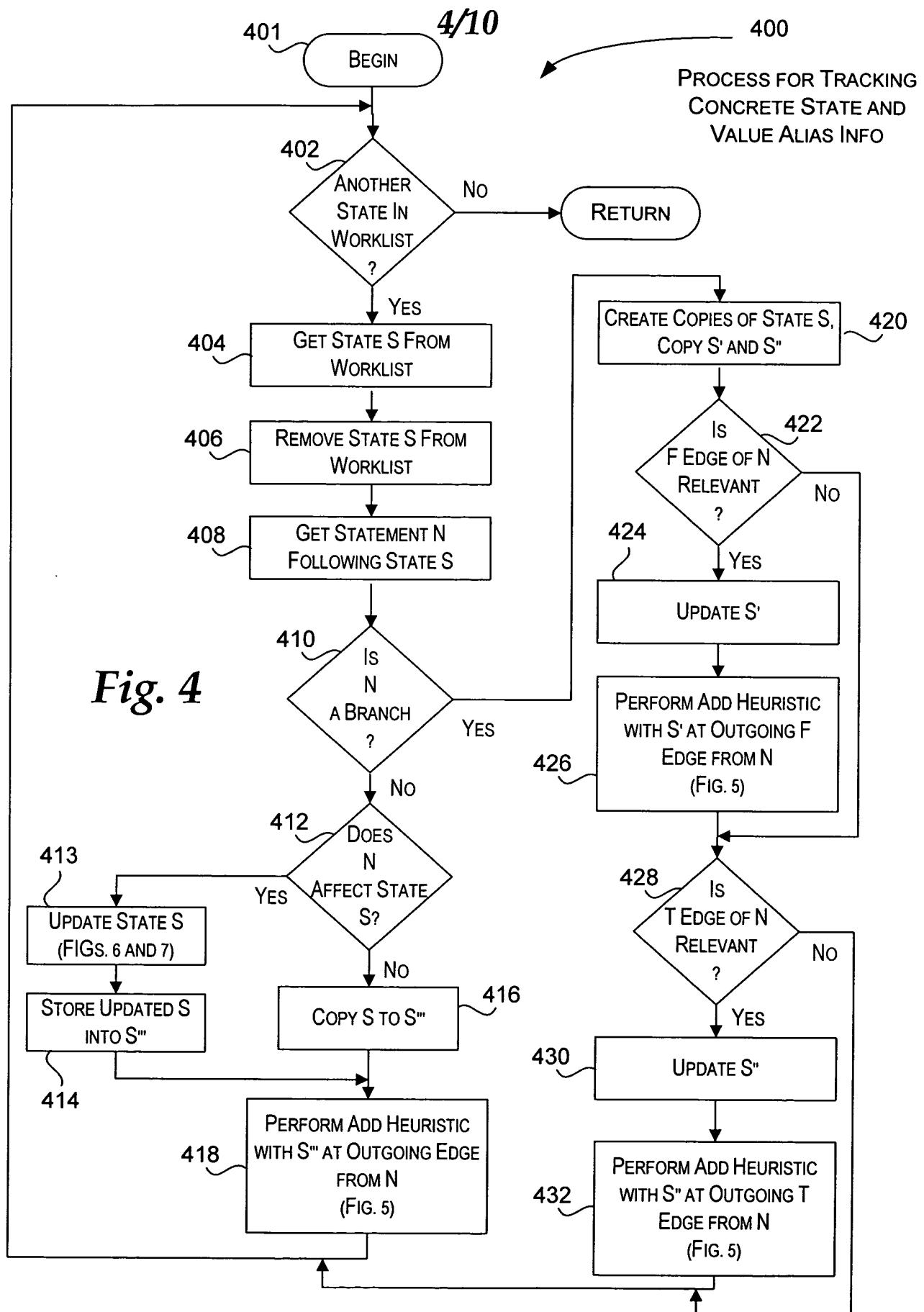
Fig. 2



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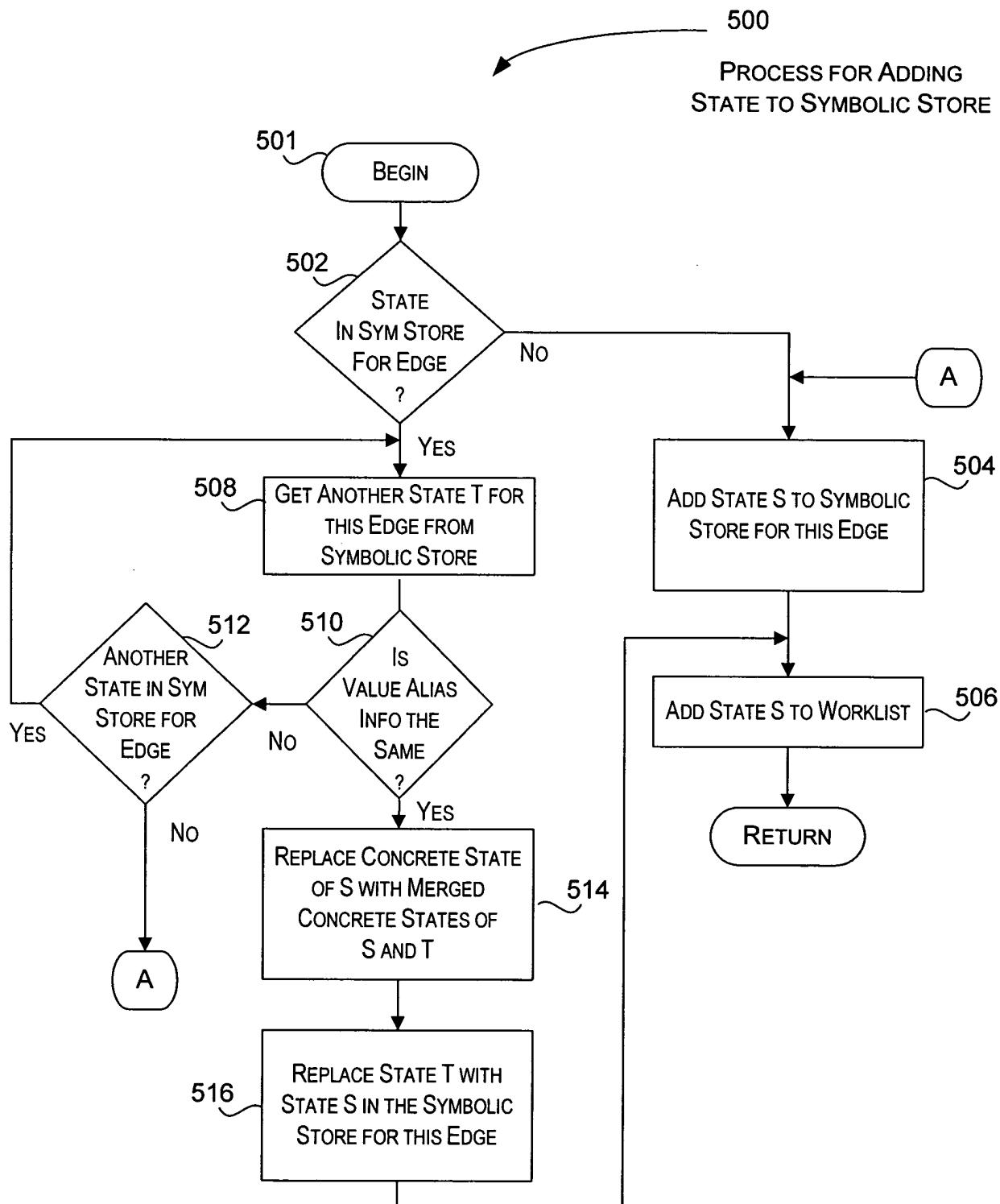


Fig. 5

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<i>v</i>	<i>Remove</i>	<i>Generate</i>
<i>x = CREATE()</i>	$\{ \}$	$\{ x \}$
<i>x = y</i>	$\{ x \rightarrow * \} \cup$ (if $(y \notin \text{must})$ $\{x\} \cup \{z \rightarrow f \mid \text{LocAlias}(z \rightarrow f, x)\}$)	$\{ x \mid y \in \text{must} \} \cup$ $\{x \rightarrow f \mid y \rightarrow f \in \text{must} \}$
<i>x = &y</i>	$\{ x \rightarrow * \} \cup \{x\} \cup \{z \rightarrow f \mid \text{LocAlias}(z \rightarrow f, x)\}$	$\{ x \rightarrow \text{NULL} \mid y \in \text{must} \}$
<i>x = allocate()</i>	$\{ x \rightarrow * \} \cup \{x\} \cup \{z \rightarrow f \mid \text{LocAlias}(z \rightarrow f, x)\}$	$\{ \}$
<i>x = y → f</i>	$\{ x \rightarrow * \} \cup$ (if $(y \rightarrow f \notin \text{must})$ $\{x\} \cup \{z \rightarrow g \mid \text{LocAlias}(z \rightarrow g, x)\}$)	$\{ x \mid y \rightarrow f \in \text{must} \}$
<i>x = &x(y → f)</i>	$\{ x \rightarrow * \} \cup \{x\} \cup \{z \rightarrow g \mid \text{LocAlias}(z \rightarrow g, x)\}$	$\{ x \rightarrow \text{NULL} \mid y \rightarrow f \in \text{must} \}$
<i>x → f = y</i>	$\{ z \rightarrow * \mid \text{LocAlias}(x \rightarrow f, z) \} \cup$ (if $(y \notin \text{must})$ $\{ x \rightarrow f \} \cup \{z \rightarrow g \mid \text{LocAlias}(x \rightarrow f, z \rightarrow g)\} \cup$ $\{ z \mid \text{LocAlias}(x \rightarrow f, z) \}$)	$\{ x \rightarrow f \mid y \in \text{must} \}$
<i>Other</i>	$\{ x \mid \text{LocAlias}(x, \text{Mods}(v)) \} \cup$ $\{ x \rightarrow f \mid \text{LocAlias}(x, \text{Mods}(v)) \vee$ $\text{LocAlias}(x \rightarrow f, \text{Mods}(v)) \}$	$\{ \}$

Fig. 6

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<i>v</i>	<i>Remove</i>	<i>Generate</i>
<i>x</i> = CREATE()	{ }	{ <i>x</i> }
<i>x</i> = <i>y</i>	{ <i>x</i> }	{ <i>x</i> LocAlias(<i>y, may</i>) }
<i>x</i> = <i>&y</i>	{ <i>x</i> }	{ }
<i>x</i> = allocate()	{ <i>x</i> }	{ }
<i>x</i> = <i>y</i> → <i>f</i>	{ <i>x</i> }	{ <i>x</i> LocAlias(<i>y</i> → <i>f, may</i>) }
<i>x</i> = <i>&(y</i> → <i>f)</i>	{ <i>x</i> }	{ }
<i>x</i> → <i>f</i> = <i>y</i>	{ }	{ <i>x</i> → <i>f</i> LocAlias(<i>y, may</i>) }
Other	{ }	{ <i>e</i> (<i>e</i> ∈ Mods(<i>v</i>)) ∧ LocAlias(Refs(<i>v</i>), <i>may</i>) }

Fig. 7

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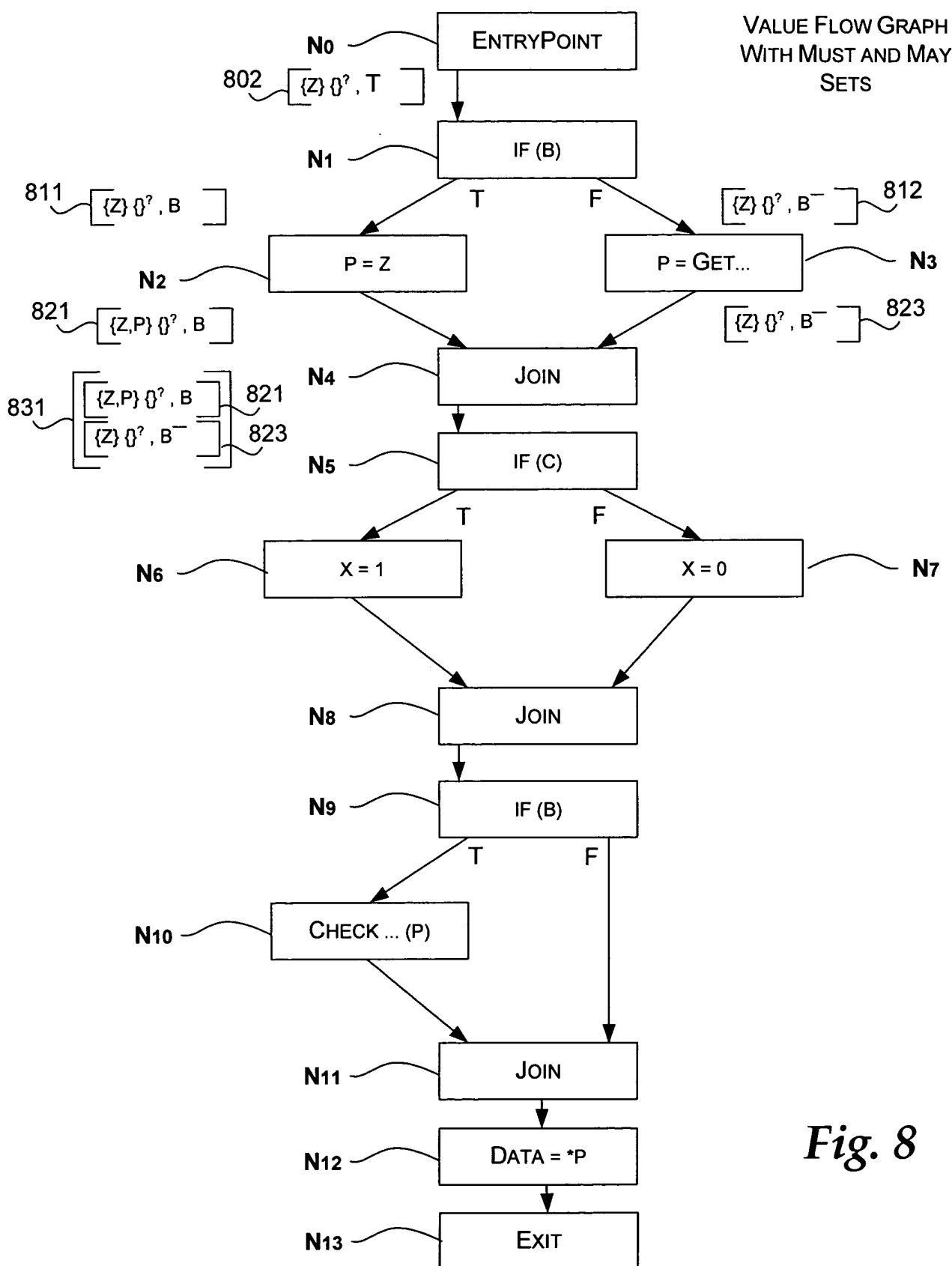


Fig. 8

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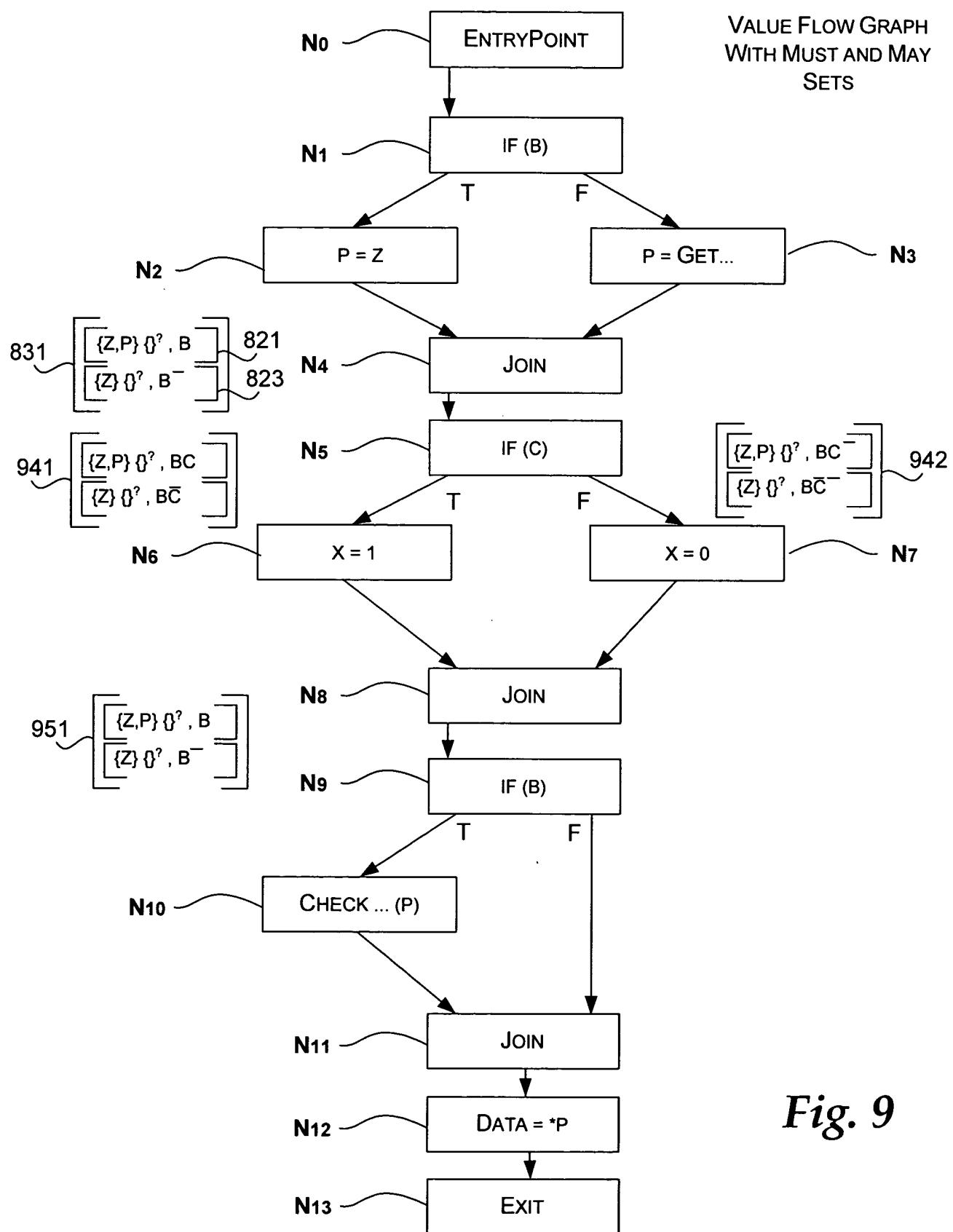


Fig. 9

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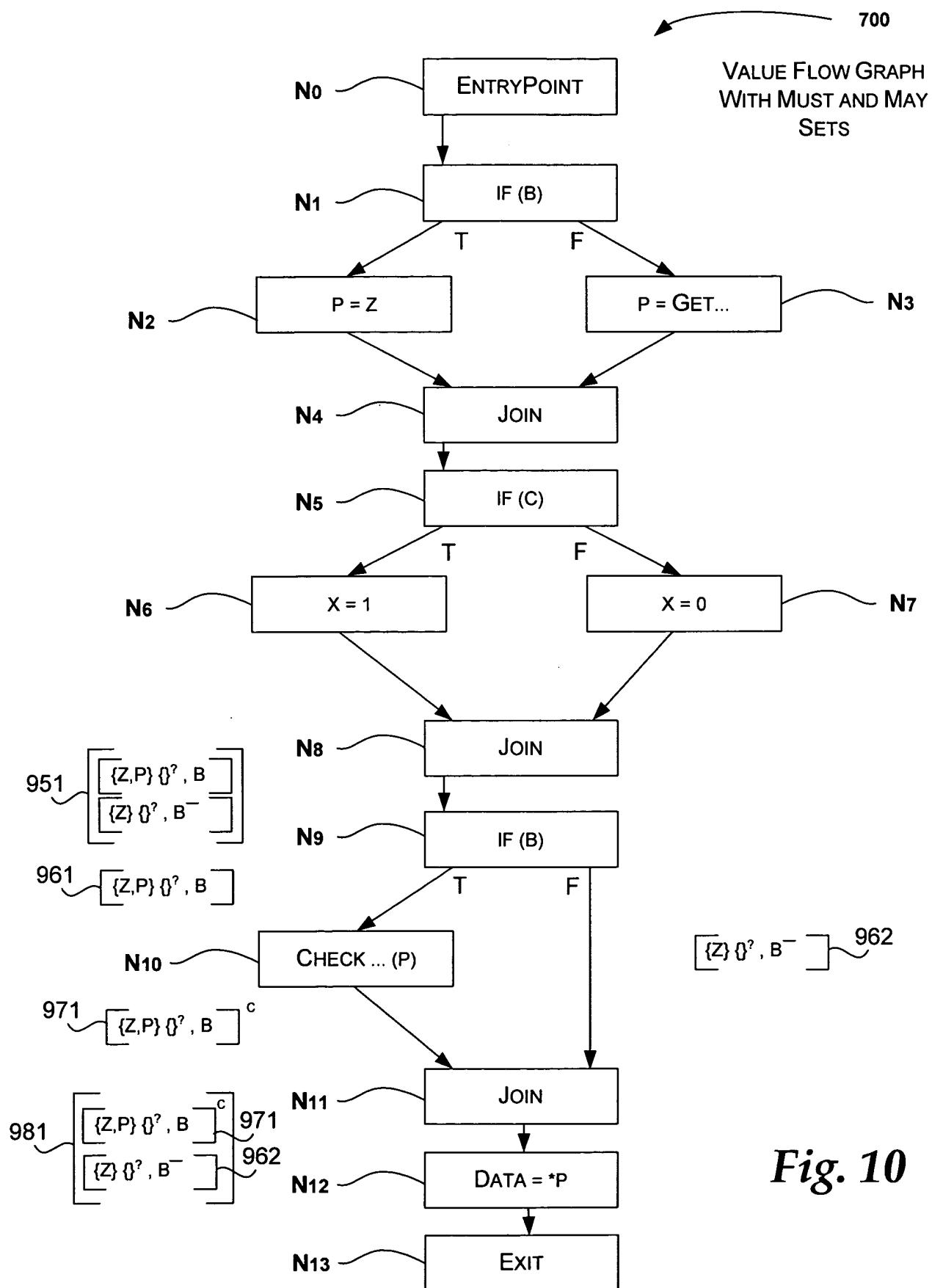


Fig. 10